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Method and Apparatus for Monitoring and Resetting a Co-Processor
Docket No. 00100.03.0032

```
                                                          ╭─104      ╭─108
                                    ╭─100
┌─────────────────────────────────────────────────────────────────────┐
│ processor                                                            │
│  ┌────────────────────────────────────────────────────────────────┐ │
│  │ circuit for monitoring and resetting a co-processor            │ │
│  │  ┌──────────────────────┐  hang      ┌──────────────────────┐  │ │
│  │  │                      │  notification│ selective processor │  │ │
│  │  │ hang detector module │─────────────▶│   reset module      │  │ │
│  │  └──────────────────────┘            └──────────────────────┘  │ │
│  └────────────────────────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────────────────┘
         │                              │                    ▲
        106                            110                   │─112
                                                             ▼
                                              ┌──────────────────────┐
                                              │     co-processor      │
                                              └──────────────────────┘
                                                                  ╲─102
```
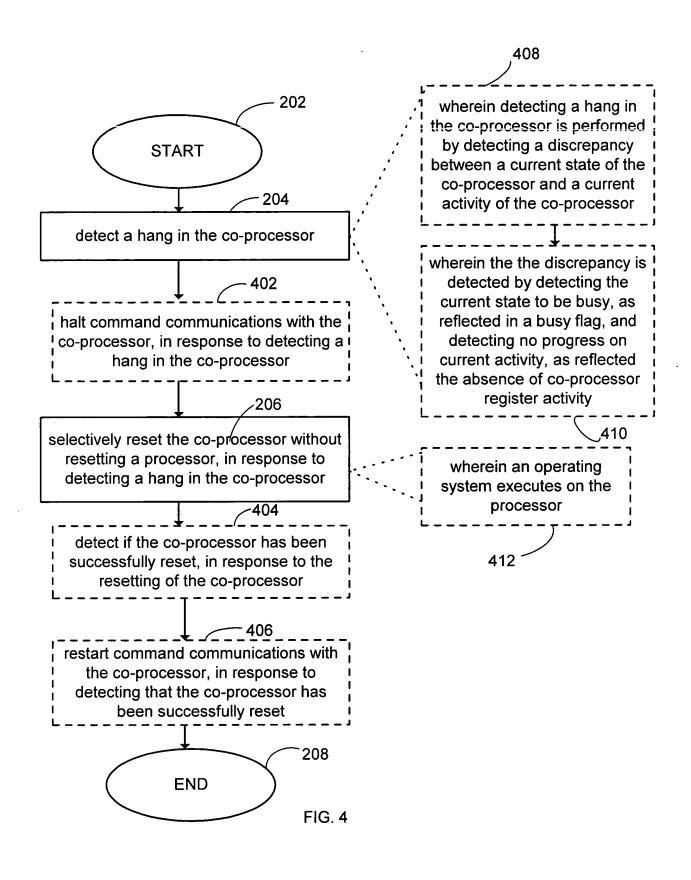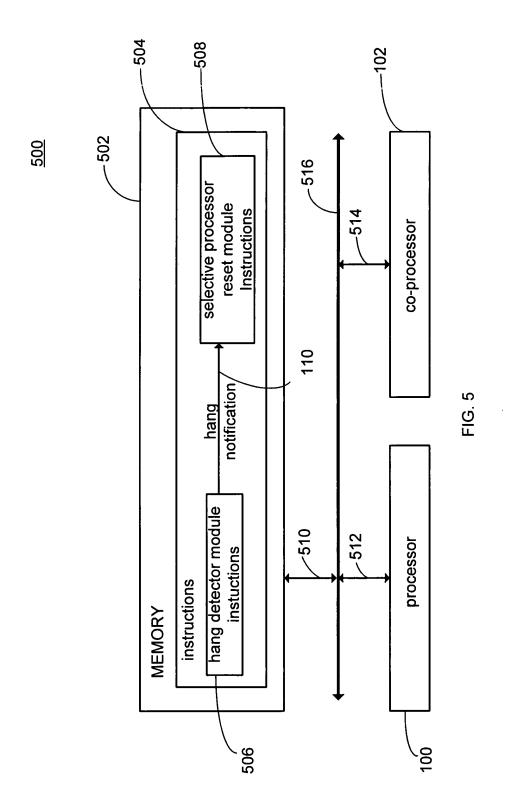
FIG. 1

FIG. 2

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FIG. 3

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202

START

204

detect a hang in the co-processor

402

halt command communications with the co-processor, in response to detecting a hang in the co-processor

206

selectively reset the co-processor without resetting a processor, in response to detecting a hang in the co-processor

404

detect if the co-processor has been successfully reset, in response to the resetting of the co-processor

406

restart command communications with the co-processor, in response to detecting that the co-processor has been successfully reset

208

END

408

wherein detecting a hang in the co-processor is performed by detecting a discrepancy between a current state of the co-processor and a current activity of the co-processor

wherein the the discrepancy is detected by detecting the current state to be busy, as reflected in a busy flag, and detecting no progress on current activity, as reflected the absence of co-processor register activity

410

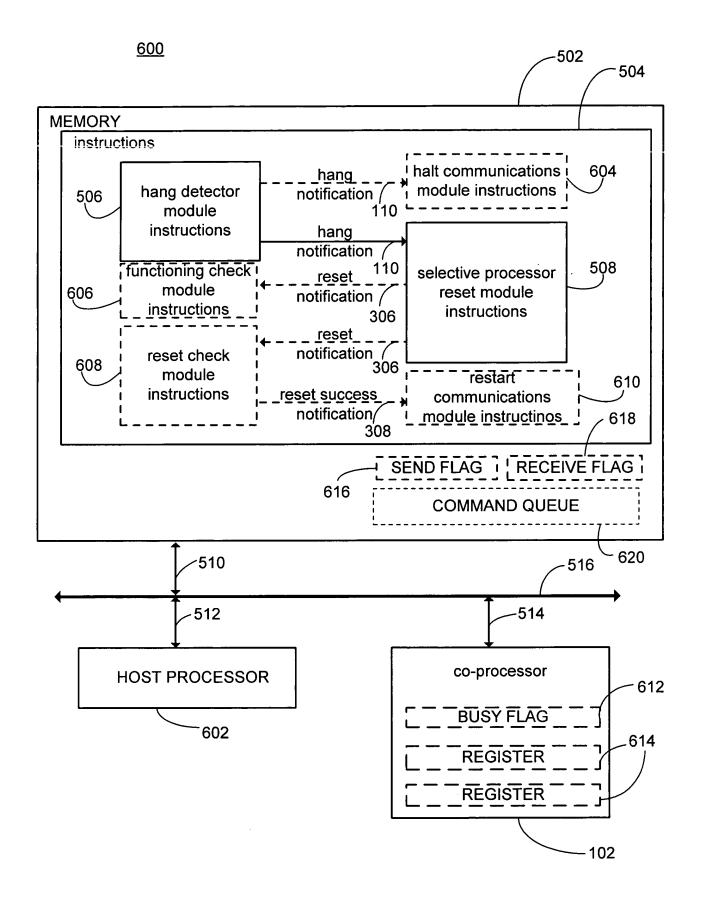wherein an operating system executes on the processor

412
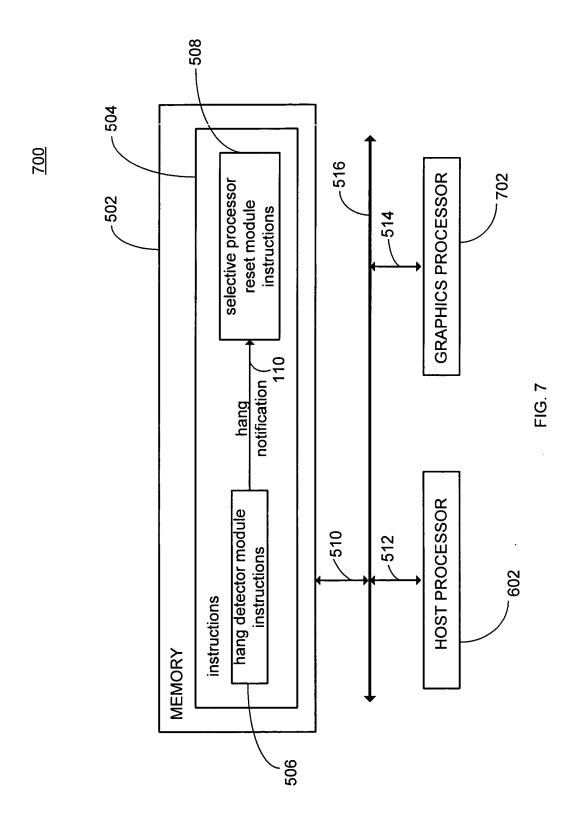
FIG. 4

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FIG. 5

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600

502
504

MEMORY

instructions

506 — hang detector module instructions

hang notification
110

halt communications module instructions
604

hang notification
110

selective processor reset module instructions
508

606 — functioning check module instructions

reset notification
306

608 — reset check module instructions

reset notification
306

reset success notification
308

restart communications module instructinos
610

618

SEND FLAG
616

RECEIVE FLAG

COMMAND QUEUE

510

516

620

512

514

HOST PROCESSOR

602

co-processor

612
BUSY FLAG

REGISTER
614

REGISTER

102

FIG. 6

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700

MEMORY

502

instructions

504

508

506

hang detector module instructions

hang notification

110

selective processor reset module instructions

510

512

514

516

HOST PROCESSOR

602

GRAPHICS PROCESSOR

702

FIG. 7

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FIG. 8

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900

MEMORY

instructions
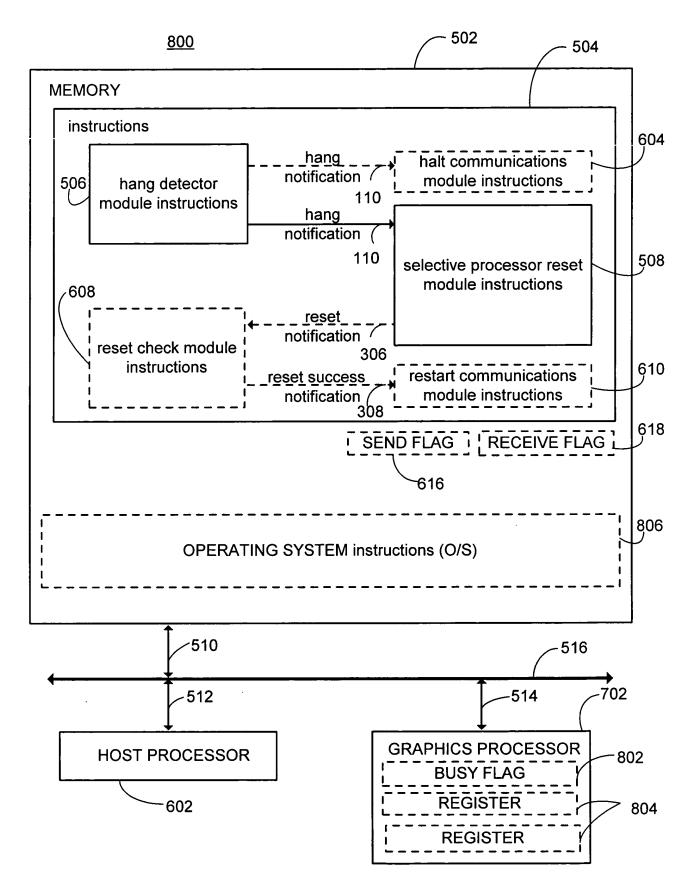
report send prompt module instructions

910

hang resolved prompt module instructions

908

software rendering module instructions

906

GRAPHICS COMMAND QUEUE

902

502   504

send request notification   922

report send module instructions   912

hang notification

hang detector module instructions   110

506

function success notification   920

display mode switch module instructions   904

function failure notification   916

functioning check module instructions

reset failure notification   918

reset check module instructions

reset failure notification   918

hang unresolved prompt module instructions   914

halt communications module instructions

hang notification   604

save snapshot module instructions   110   915

hang notification   110

reset notification   306

selective processor reset module instructions   508

reset notification   306

reset notification   606   306

reset success notification   308   608

restart communications module instructions   610

SEND FLAG   616   RECEIVE FLAG   618

510   516

512   514   702

HOST PROCESSOR

602

GRAPHICS PROCESSOR   802

BUSY FLAG

REGISTER   804

REGISTER

FIG. 9

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START — 1001

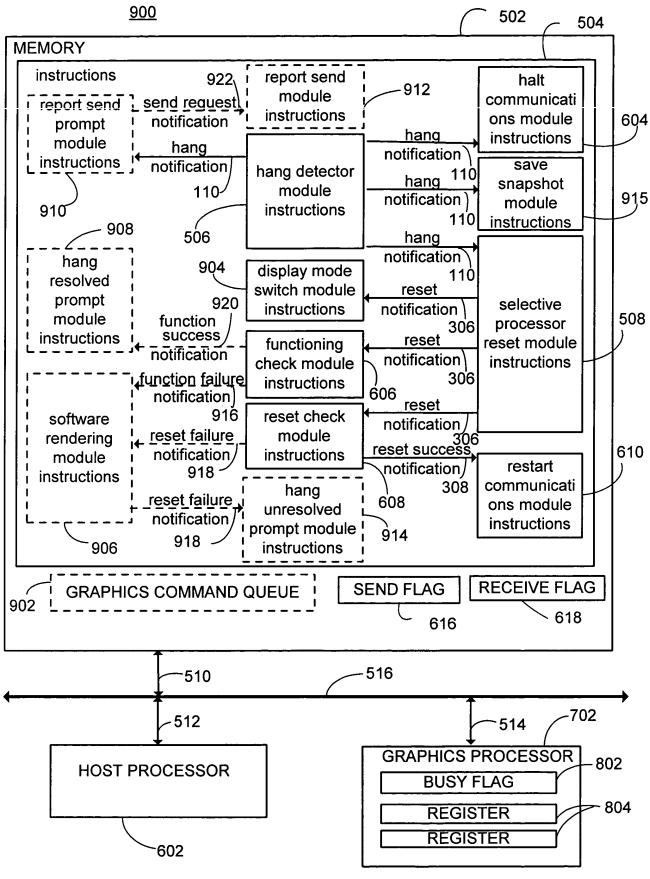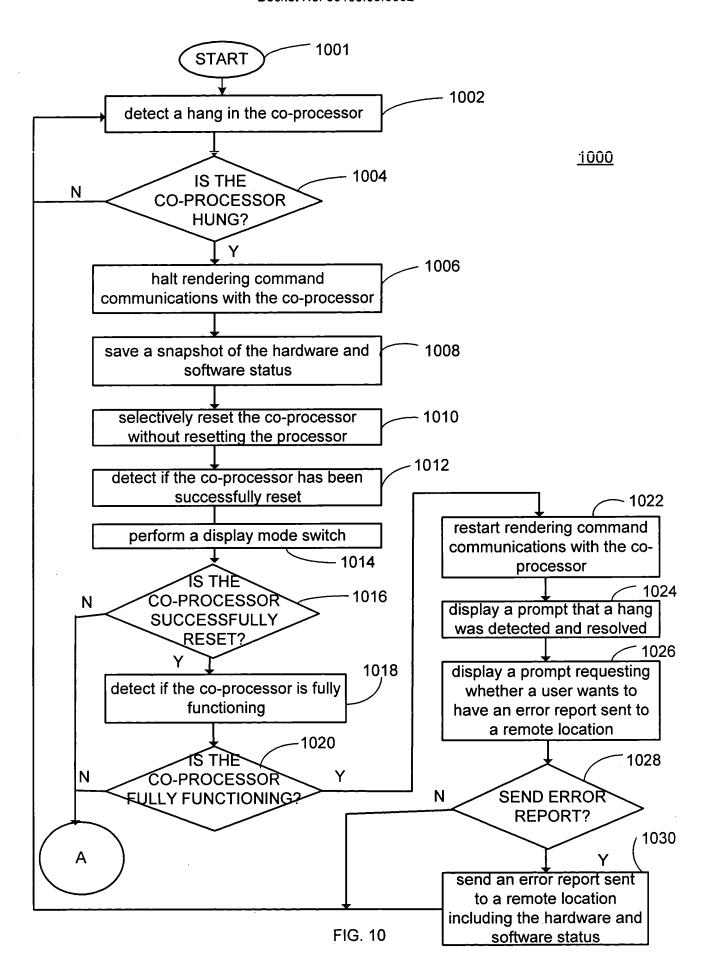detect a hang in the co-processor — 1002

1000

IS THE CO-PROCESSOR HUNG? — 1004

N

Y

halt rendering command communications with the co-processor — 1006

save a snapshot of the hardware and software status — 1008

selectively reset the co-processor without resetting the processor — 1010

detect if the co-processor has been successfully reset — 1012

perform a display mode switch — 1014

IS THE CO-PROCESSOR SUCCESSFULLY RESET? — 1016

N

Y

detect if the co-processor is fully functioning — 1018

IS THE CO-PROCESSOR FULLY FUNCTIONING? — 1020

N

Y

A

restart rendering command communications with the co-processor — 1022

display a prompt that a hang was detected and resolved — 1024

display a prompt requesting whether a user wants to have an error report sent to a remote location — 1026

SEND ERROR REPORT? — 1028

N

Y

send an error report sent to a remote location including the hardware and software status — 1030

FIG. 10

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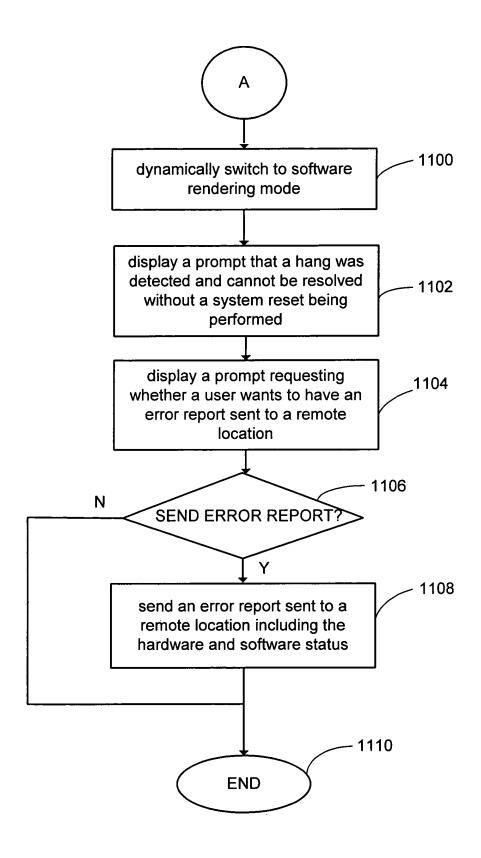Method and Apparatus for Monitoring and Resetting a Co-Processor
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A

dynamically switch to software rendering mode — 1100

display a prompt that a hang was detected and cannot be resolved without a system reset being performed — 1102

display a prompt requesting whether a user wants to have an error report sent to a remote location — 1104

SEND ERROR REPORT? — 1106

N

Y

send an error report sent to a remote location including the hardware and software status — 1108

END — 1110

FIG. 11